GREAT LAKES FORESTRY CENTRE
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Results of forest insect and disease surveys in the SOUTHWESTERN REGION of Ontario, 1987

CARRIED OUT BY THE GREAT LAKES FORESTRY CENTRE IN COOPERATION WITH THE ONTARIO MINISTRY OF NATURAL RESOURCES

H. Brodersen and W. D. Biggs

Miscellaneous Report No. 80

THE GREAT LAKES FORESTRY CENTRE

The Great Lakes Forestry Centre is one of six regional establishments located across Canada and operated by the Canadian Forestry Service. The overall objective of the Service is to promote the preservation, enhancement and wise use of a healthy, attractive and bountiful forest resource and terrestrial environment for the economic and social benefit of all Canadians. The Centre pursues this objective by conducting two major programs: research and technical services and forestry development. Both programs address major problems affecting forest management and the forest environment primarily in Ontario, but because of the transprovincial nature of the forest resource, many elements of our research program are of national significance.

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RESULTS OF FOREST INSECT AND DISEASE SURVEYS IN THE SOUTHWESTERN REGION OF ONTARIO, 1987

(FOREST DISTRICTS OWEN SOUND, WINGHAM CHATHAM, AYLMER AND SIMCOE)

H BRODERSEN and W.D BIGGS

GREAT LAKES FORESTRY CENTRE

CANADIAN FORESTRY SERVICE

GOVERNMENT OF CANADA

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SURVEY HIGHLIGHTS

This report deals with forest insects and diseases encountered in the course of regular and special surveys carried out during the 1987 field season in the Southwestern Region of Ontario. Cedar leafminer damage was encountered routinely throughout the region, albeit primarily at low levels of damage. Oak leaf skeletonizer and oak leaf shredder damage both remained at low levels. Spruce budworm populations remained endemic throughout the region; this year, for the first time, an overview of the spruce budworm situation in Ontario has been included in this report. Defoliation caused by the walnut caterpillar decreased to low levels and trace levels of damage by the maple trumpet skeletonizer were noted. The incidence of gypsy moth continues to rise across the region, and the first significant defoliation by this pest was documented in Simcoe District. With the exception of Simcoe District, where damage increased, white pine weevil damage remained constant throughout the region.

In surveys for both races of Scleroderris canker no infection by this disease was found. The incidence of diplodia tip blight on pine continues to rise. Ten permanent sugar maple decline plots were established across the region to monitor the current and future condition of this species. Significant amounts of winter drying were recorded on cedar windbreaks across the southern portions of the region. Spruce was the species-group chosen in 1987 for the plantation survey and the cone and seed survey. The pinewood nematode survey has confirmed the presence of this pest in seven townships within the Southwestern Region.

The authors wish to extend their thanks to the Ontario Ministry of Natural Resources (OMNR) and all other supporting agencies and individuals for their assistance in the 1987 field season.

As in previous years, pests described in this report are categorized as follows:

Major Insects/Diseases

Capable of causing serious injury to or death of living trees or shrubs.

Minor Insects/Diseases

Capable of causing sporadic or localized injury but not usually a serious threat to living trees or shrubs.

Other Forest Insects/Diseases (Tables)

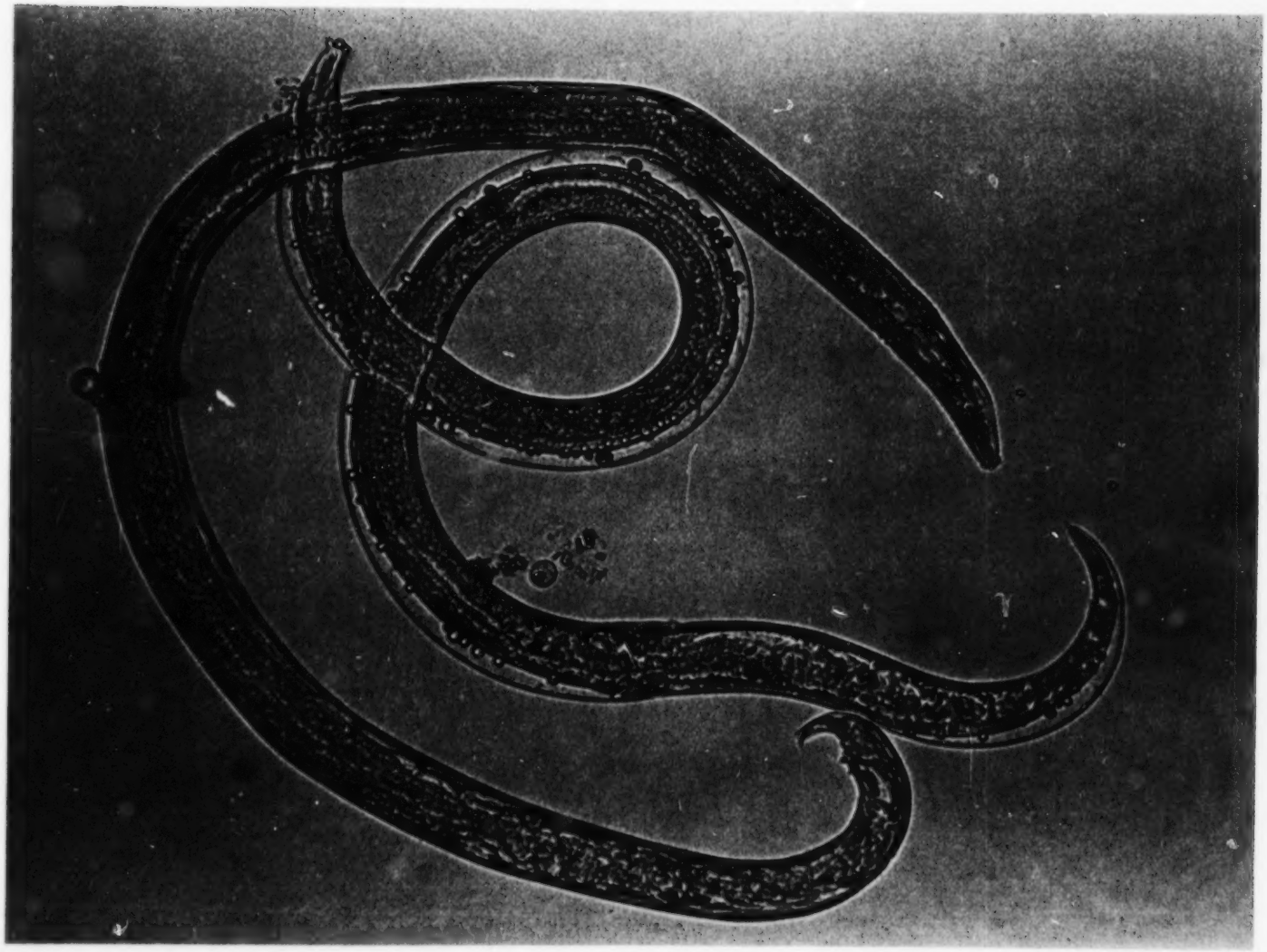
These tables provide information on two types of pest:

(1) those that are of minor importance and have not been known to cause serious damage to forest trees, and

(2) those that are capable of causing serious damage but did not do so, because of low populations or for other reasons.

H. Brodersen
W.D. Biggs

Frontispiece



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INSECTS

Major Insects

Cedar Leafminers, *Argyresthia aureoargentella* Brower, *A. canadensis* Free., *A. thuiella* (Pack.), and *Coleotechnites thujaella* (Kft.)

This pest was frequently encountered across the region but, for the most part, it caused low levels of damage. The survey undertaken this spring was expanded to encompass approximately 60 townships in five districts.

Throughout the Wingham, Chatham, Aylmer and Simcoe districts approximately half of all checks of eastern white cedar (*Thuja occidentalis* L.) windbreaks, hedgerows and natural stands revealed low levels (5-10%) of foliar damage. This represents a slight decrease from the average foliar damage levels (5-15%) reported for the same areas in 1986.

The highest percentage of infested sites (75%) was recorded in Simcoe District, where 57% of the trees at those sites sustained low levels of damage (7%). The lowest incidence of damaged sites (45%) occurred in Chatham District, where low levels of foliar damage (6%) were noted on 40% of the trees examined. Across the Wingham and Aylmer districts the percentage of examined sites at which trees were attacked, the percentage of trees infested at those sites and the average defoliation of damaged individuals were similar (57%, 56% and 6%, respectively) across the two districts.

Low-to-moderate levels of foliar damage (20-40%) were recorded in most of the natural stands examined across the northeastern and central portions of Owen Sound District. Across the northern portions of the Bruce Peninsula (primarily throughout the townships of Lindsay, Eastnor and Albemarle), low-to-moderate levels of defoliation (20-40%) were encountered routinely. Moderate-to-severe damage (75-100%) was recorded at MacGregor Point Provincial Park in Saugeen Township as well in the Pike Bay area of Albemarle Township.

Spruce Budworm, *Choristoneura fumiferana* (Clem.)

From the results of egg-mass, pheromone and damage surveys across the Southwestern Region it is predicted that budworm populations will remain at endemic levels throughout the region next year.

However, for the province as a whole, there was a pronounced decline in both area and intensity of defoliation caused by the spruce budworm in 1987. In all, 7,189,763 ha of moderate-to-severe defoliation were mapped during aerial and ground surveys. This represents a 19% decrease in the area of the infestation since 1986.

All of the aforementioned damage was recorded in the Northwestern and North Central regions (Fig. 1), with the exception of 350 ha noted in Bracebridge District, Algonquin Region.

Oak Leaf Shredder, *Croesia semipurpurana* (Kft.)

Surveys of woodlots that contained significant amounts of oak were conducted throughout 19 townships across the Chatham, Aylmer and Simcoe districts; the results were similar to those of the 1986 survey, and indicated the presence of low population levels at widely scattered locations across much of the region. The numbers of larvae encountered continued to decline at all of the surveyed locations; the average level of defoliation recorded in 1987 was trace (2%), a decrease from the low levels (6%) reported in 1986.

Damage by this pest was discernible at 25% of the locations examined on one or more of the following species: red oak (*Quercus rubra* L.), black oak (*Q. velutina* Lam.) and bur oak (*Q. macrocarpa* Michx.). The highest recorded incidence of attacked stands (50%) was in Simcoe District, where 77% of all trees examined in infested woodlots experienced an average of 5% defoliation. The lowest incidence of infested stands (10%) was recorded in Chatham District, where 66% of the oak at infested sites experienced an average of 1% defoliation. Across Aylmer District, in 25% of the woodlots surveyed, trace levels (1%) of defoliation by this insect were evident on 33% of the trees that were examined.

Defoliation forecasts on the basis of egg densities, along with defoliation estimates and pheromone trapping results (from the oak decline plots), are given in Table 1.

Walnut Caterpillar, *Datana integerrima* G. & R.

The incidence of attacked trees across Chatham, Aylmer and Simcoe districts (51%) was nearly unchanged from last year's average; however, defoliation was lower (16% vs 30% in 1986).

The highest recorded incidence of attacked trees was in Chatham District, where 55% of all black walnuts (*Juglans nigra* L.) experienced 26% defoliation. This was followed by Simcoe District where incidence and defoliation were 52% and 10%, respectively. In Aylmer District, the corresponding levels were 46% and 14%, respectively. In Wingham District, where walnut is scarce, an average of 5% defoliation on 12% of trees was recorded.

The highest incidence of attack occurred in Malahide Township, Aylmer District where virtually 100% of all black walnut trees surveyed suffered low levels (<10%) of defoliation.

NORTHWESTERN ONTARIO

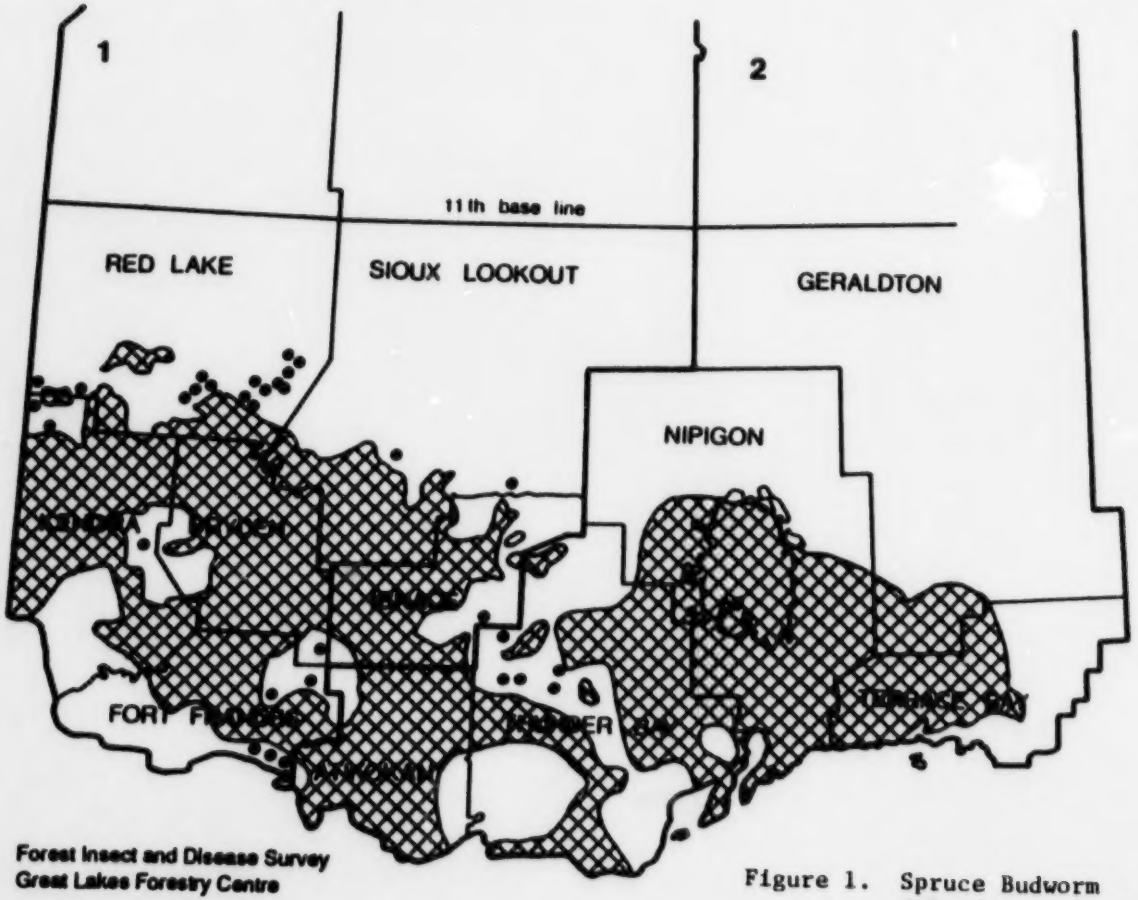

Figure 1. Spruce Budworm
(*Choristoneura fumiferana* [Clem.])

Areas within which moderate-to-severe defoliation occurred in 1987 ..... ▨ or •

Table 1. Results of oak leaf shredder pheromone trapping, egg counts and defoliation forecasts for two districts in 1987 (five traps deployed at each location).

Location	Total no. of adults captured 1987	Avg no. per trap 1987	Concentration of pheromone (%)	Leaves attacked 1987 (%)	Foliar damage 1987 (%)	No. of eggs 1986	No. of eggs 1987	Defoliation forecast for 1988
Chatham District								
Bosanquet Twp (Pinery Prov. Park)	0	0	0.003	1.5	1	0	0	nil
Simcoe District								
Charlotteville Twp (Turkey Pt. Prov. Park)	0	0	0.003	4.2	1	0	2	low
South Walsingham Twp (St. William Forest Station)	1	0.2	0.03	4.5	1	1	0	nil

Birch Leafminer, *Fenusa pusilla* (Lep.)

Although the incidence of attacked trees has varied considerably over the previous five years, actual foliar damage, on average, has remained consistently low (5-25%) across the southern portions of the region. In 1987, 59% of ornamental white birches (*Betula papyrifera* Marsh.) examined in Wingham, Chatham, Aylmer and Simcoe districts experienced an average of 3% foliar damage. Damage caused to foliage by second-generation larvae was negligible.

The highest recorded incidence of attacked trees was in Wingham District, where 71% of the ornamentals examined experienced an average of 4% foliar damage. Across Aylmer District 65% of the trees checked exhibited an average of 3% damage. Chatham and Simcoe districts had incidence and foliar damage rates of 48% and 2% and 50% and 4%, respectively.

Stands of natural white birch that suffered heavy foliar damage (>75%) were encountered routinely further north, across Owen Sound District.

Fall Webworm, *Hyphantria cunea* (Dru.)

This pest was routinely encountered at locations throughout Wingham, Chatham, Aylmer and Simcoe districts, primarily at low damage levels (10%). In surveys conducted across 76 townships in these districts many webs were found in 46 of them. Typically, a single webmass was noted on each of a variety of hardwood hosts. The preferred hosts, however, were white ash (*Fraxinus americana* L.), black walnut and shagbark hickory (*Carya ovata* [Mill.] K. Koch).

Simcoe District had the highest percentage of surveyed townships (88%) that hosted populations of this late-summer defoliator; overall incidence decreased slightly from 1986, when low numbers of webs were noted in every township checked. Low populations prevailed throughout this district, except along an 11-km stretch of Hwy 24, between Regional Road 10 and Hwy 6, where there were many webs per tree (an average of 30-50 webs/km of travel).

Across Wingham and Aylmer districts low numbers of webs and low levels of defoliation were observed in approximately 42% of all townships surveyed.

In Chatham District, 73% of all townships surveyed commonly hosted low populations of this pest; however, high populations were noted on a variety of roadside hardwoods along Regional Road 20, south of the Moravian Indian Reserve in Oxford Township. The levels of defoliation that resulted, however, were still low (15%).

Gypsy Moth, *Lymantria dispar* (L.)

Burlap and pheromone traps were deployed at 12 provincial parks in 1987 (Table 2) as well as at the Canadian Forces Training Area (FTA) located northwest of the town of Meaford, in Owen Sound District. Moth captures at the provincial parks were significantly higher than in 1986. The exceptions noted were at Rondeau Provincial Park, Chatham District, and at Points Farm Provincial Park, Wingham District, where the pheromone traps were stolen. The single location at which larvae were captured was Turkey Point Provincial Park, where there is a low-level infestation.

The annual mid-July aerial survey was conducted largely along the same flight pattern as was described in the 1986 regional survey report. Aerial mapping of the infestation north of the St. Williams Forest Station, South Walsingham Township, revealed approximately 122 ha of moderate-to-severe defoliation; defoliation averaged 75%, primarily on oaks (*Quercus* spp.), maples (*Acer* spp.), poplars (*Populus* spp.) and cherries (*Prunus* spp.). No other discernable defoliation was recorded during the balance of the aerial surveys.

For the first time, egg masses were documented in the southern half of lot 18, concession 8, Walpole Township, Simcoe District. At this location several new egg masses were observed on the bole of a mature roadside bur oak.

No new infestations were recorded in Aylmer District. To date no record of this pest (other than adult moths) has been documented in Owen Sound District.

Numerous egg masses that had been reported by OMNk personnel were confirmed this fall in stands of 20-m-tall, mixed hardwoods in the Boosey campground of Wheatley Provincial Park, Romney Township, Chatham District. This fall, OMNR personnel from Wingham District reported the first incidence of gypsy moth (a single egg mass) in Howick Township. Since 1985, either larvae or egg masses have been documented in eight townships across the region (Fig. 2). A successful spray operation was conducted by OMNR on a 40-ha mixed hardwood woodlot in South Walsingham Township, Simcoe District. Egg-mass densities at this location were 144/ha, down from the average of 389/ha that was noted prior to spraying.

Eastern Tent Caterpillar, *Malacosoma americanum* F.

In most years, this pest is routinely encountered at low numbers, and causes insignificant levels of damage throughout the entire work area. This spring, however, small pockets (<1 ha on average) of light defoliation (20%) on cherry trees, including some mature black

cherry (*Prunus serotina* Ehrh.), were observed at various locations. This was most notable in Aylmer District in the townships of Caradoc, Ekfrid and London where cherries alongside roads, in abandoned fields and in woodlots hosted large numbers of tents. Similar damage levels were recorded along Hwy 21 in Bosanquet Township, Chatham District. Across the northern portion of Wingham District, varying degrees of moderate defoliation (25-75%), primarily on choke cherry (*Prunus virginiana* L.), were noted in the townships of Colborne (including Point Farms Provincial Park), Kinloss, Howick and Minto. Tents were also reported to be common on small cherry shrubs in the northeast and central portions of Owen Sound District.

Table 2. Results of gypsy moth burlap and pheromone trapping in 1987.

Location (Park)	No. of burlap traps	No. of larvae caught	No. of pheromone traps	No. of male moths caught
Aylmer District				
Iroquois Beach	10	0	2	37
Chatham District				
Rondeau	10	0	2	10
Ipperwash	10	0	2	37
Pinery	10	0	2	48
Owen Sound District				
Craigleith	10	0	2	27
Cyprus Lake	10	0	2	41
MacGregor's Pt.	10	0	2	40
Sauble Falls	10	0	2	36
CFTA Meaford	na	na	10	74
Simcoe District				
Longpoint	10	0	2	33
Selkirk	10	0	2	48
Turkey Pt.	10	11	2	49
Wingham District				
Points Farm	10	0	stolen	0

na = not available

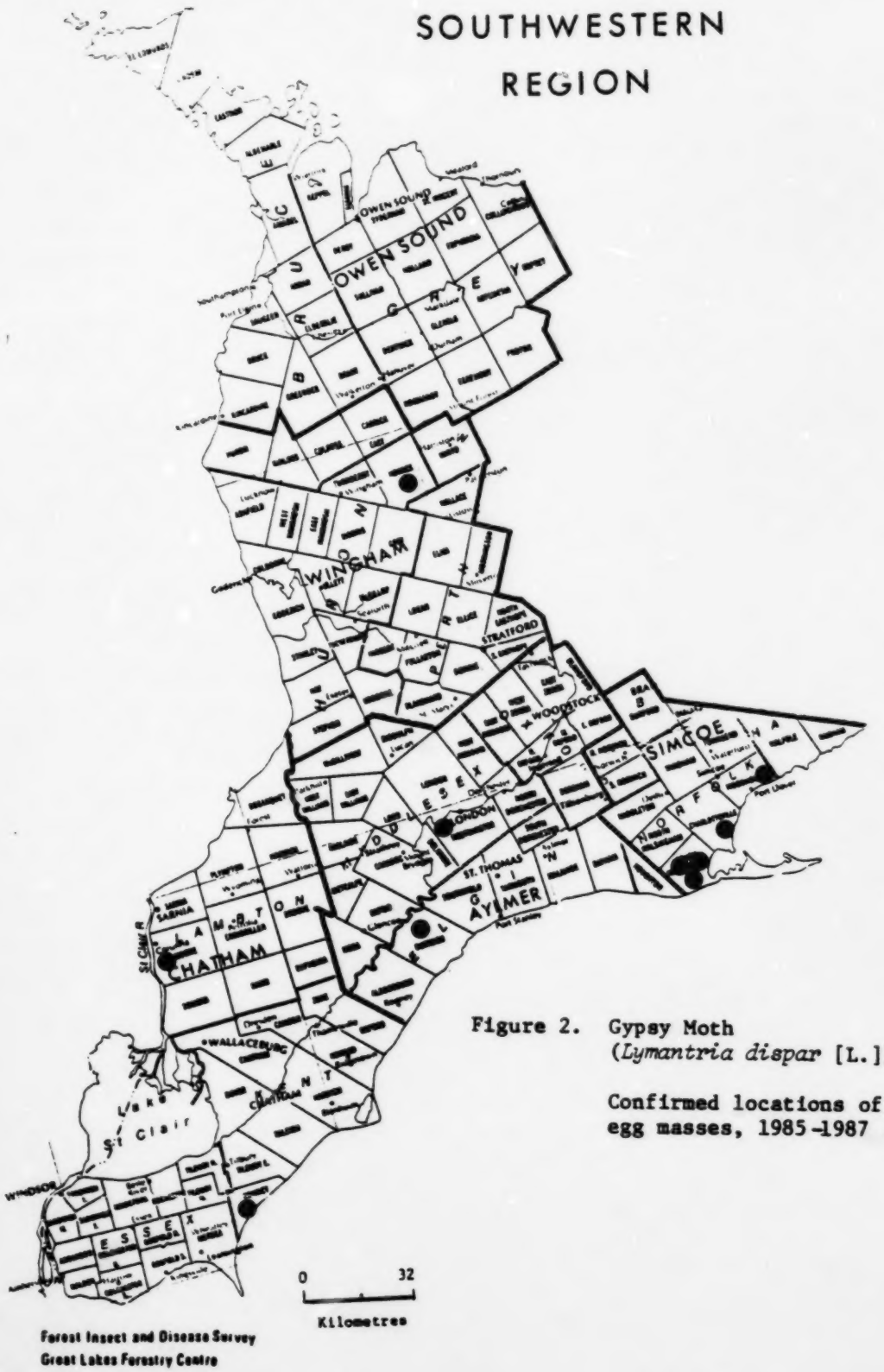

Figure 2. Gypsy Moth
(*Lymantria dispar* [L.])

Confirmed locations of larvae or egg masses, 1985-1987 ..... ●

White Pine Weevil, *Pissodes strobi* (Peck)

Weevil populations remained stable in the monitored eastern white pine (*Pinus strobus* L.) plantations surveyed in 1987 (Table 3). The exceptions include a single plantation in Wingham District and most of the plantations surveyed in Simcoe District, where damage increased.

Table 3. Summary of leader damage by white pine weevil in four districts in 1987 (counts based on the examination of 100 white pine trees at each location).

Location (Twp)	Avg height of trees (m)	Approximate stocking (trees/ha)	Area affected (ha)	Leaders attacked (%) 1986	1987
Aylmer District					
Bayham	3.0	1415	2.5	1	1
Delaware	3.5	2900	13.0	0	0
Dereham	5.0	2900	3.2	0	0
Lobo	2.5	2375	0.6	0	0
Mosa	3.0	2320	1.0	0	0
N. Dorchester	5.0	1990	5.0	0	0
W. Oxford	3.5	2990	3.0	10	11
E. Zorra	5.5	1990	1.5	0	0
W. Zorra	5.0	2900	1.3	0	0
Yarmouth	4.5	2900	2.5	0	1
Chatham District					
Zone	2.2	2990	0.8	0	0
Simcoe District					
Charlotteville	3.0	2900	0.2	na	17
Charlotteville	2.5	2900	1.6	3	5
S. Walsingham	6.5	2900	0.6	2	6
N. Walsingham	5.5	3600	2.0	7	14
Windham	4.5	1000	0.4	3	1
Woodhouse	4.5	1900	3.5	1	3
Wingham District					
Blanshard	4.5	1250	1.2	0	0
Carrick	2.5	1990	1.2	0	0
Goderich	3.0	1780	0.6	0	0
Hullett	4.0	1200	50.0	0	0
Kinloss	4.5	2900	10.0	1	1
Mornington	5.5	2900	3.3	0	0
Turnberry	3.0	2900	0.5	0	14

na = not available

Minor Insects

Oak Skeletonizer, *Bucculatrix ainsliella* Murt.

In approximately half of the 21 hardwood stands with a significant oak component examined across Chatham, Aylmer and Simcoe districts primarily trace-to-low damage levels (0-5%) were encountered. In 20% of the oak locations surveyed in Chatham District, 18% of the trees exhibited an average of 3% foliar damage. All woodlots surveyed in Aylmer District hosted various levels of attacked trees (72% on average) and experienced low levels of damage (5%). The highest level of foliar damage was recorded in a 5-ha woodlot in Yarmouth Township, Aylmer District, where 60% of all trees examined exhibited an average of 15% damage. Overall levels of foliar damage decreased from moderate (35%) in 1986 to low (5%) in 1987.

No significant populations were encountered at any of the woodlots checked in Simcoe, Wingham or Owen Sound districts.

Maple Trumpet Skeletonizer, *Epinotia aceriella* (Clem.)

In all, 30 sugar maple (*Acer saccharum* Marsh.) woodlots were examined in Wingham, Chatham, Aylmer and Simcoe districts to detect the presence of this late-season defoliator. All surveys conducted in Chatham and Simcoe districts revealed either no evidence of this pest or insignificant levels of damage (<1%). Except for a single woodlot in Malahide Township, which hosted a significant population, the same results were found for Aylmer district. At this location 60% of the trees examined suffered low levels of foliar damage (5%). The highest recorded incidence of infested stands (42%) was in Wingham District, where 90% of the trees in affected woodlots had low levels of foliar damage (avg 5%).

Table 4. Other forest insects.

Insect	Host(s)	Remarks
Adelges abietis (L.) Eastern spruce gall adelgid	nS	Branch mortality averaged 5% as a result of galls on approximately 60% of a 10-m-tall hedgerow in Hay Twp, Wingham District.

(cont'd)

Table 4. Other forest insects (cont'd).

Insect	Host(s)	Remarks
Anisota senatoria (J.E. Smith) Orangestriped oakworm	bO	This pest was recorded for the second consecutive year on open-grown roadside trees at several locations in Delaware, Caradoc and Ekfrid twps, Aylmer District. Defoliation averaged 56% across these townships. This defoliator was noted at one other location, in Walpole Twp, Simcoe District, where scattered individuals experienced an average of 70% defoliation.
Coleophora laricella (Hbn.) Larch casebearer	eL	Moderate foliar damage (70%) was noted on 95% of the 19-m-tall trees in a single 4.5-ha compartment on St. Williams Forest Station property in Charlotteville Twp, Simcoe District.
Contarinia negundifolia Felt Boxelder leafgall midge	moM	Midges caused moderate levels (25-75%) of foliar damage to ornamentals at scattered locations in N. Colchester and Aldborough twps in Chatham and Aylmer districts, respectively.
Lepidosaphes ulmi (L.) Oystershell scale	siM	Large numbers of adults were noted on the main stems of 40% of 5-m-tall ornamentals in the Campbell Conservation Area campgrounds in Mosa Twp, Aylmer District.
Malacosoma disstria Hbn. Forest tent caterpillar	sM, wAs	Larval counts revealed only trace levels of larvae at sites in Sullivan and Keppel twps, Owen Sound District.
Oligonychus ununguis (Jac.) Spruce spider mite	wS	a single occurrence of low (25%) foliar damage noted on 10% of a 1-m-tall hedgerow in Woodhouse Twp, Simcoe District

(cont'd)

Table 4. Other forest insects (concl.)

Insect	Host(s)	Remarks
Operophtera bruceata (Hlst.) Bruce spanworm	sM	The small infestation reported last year in Collingwood Twp, Owen Sound District, collapsed to endemic levels.
Parthenolecanium fletcheri (Ckll.) Fletcher scale	Yew	moderate levels (25%) of branch mortality on several 1-m ornamentals at a single location, in S. Walsingham Twp, Simcoe District
Pissodes approximatus Hopk. Northern pine weevil	wP	The incidence of whole- and partial-tree mortality amounted to 10% of all 2-m-tall trees in a 2-ha plantation. Many of the infested trees also bore scars from ant wounds.
Pseudexentera cressoniana Clem. Oak olethreutid leafroller	blO	Foliar damage levels were an average of 15% on 10% of all mature trees examined in a 3.5-ha woodlot in Charlotteville Twp, Simcoe District.
Rhyacionia buoliana (D. & S.) European pine shoot moth	rP	Approximately 38% of all 3-0 nursery seedlings in a single bed located at the St. Williams Forest Station (S. Walsingham Twp, Simcoe District) were infested with overwintering larvae; the shoot moth was also noted on 100% of 2-m-tall trees in a single poorly stocked plantation in Bruce Twp, Owen Sound District, where it damaged 30% of all shoots.
Xerophylla caryaecaulis (Fitch) Globular hickory gall adelgid	bHi	Various levels of branch mortality were noted on 30% of the mature trees in a 10-ha mixed hardwood lot, with whole-tree mortality of approximately 4% in Usborne Twp, Wingham District.

TREE DISEASES

Major Diseases

Scleroderris Canker, *Ascocalyx abietina* (Lagerb.) Schläpfer-Bernhard

The 1987 ground survey for both the North American and the European races of Scleroderris canker was conducted in 35 red pine (*Pinus resinosa* Ait.) and 11 Scots pine (*Pinus sylvestris* L.) plantations located in 23 townships across the five districts that comprise the South Western Region. No ground check (Fig. 3) for the incidence of either race of the fungus revealed any cankered trees. An aerial survey in late May across Simcoe District prompted ground checks of several suspect areas; however, no evidence of the fungus was detected at any of these locations.

Tip Blight, *Sphaeropsis sapinea* (Fr.) Dyko & B. Sutton

Two significant infestations of tip blight were evaluated in Simcoe District. The first was in a privately owned plantation located in the northern half of lot 19, concession 6, South Walsingham Township, where 80% of the 15-m-tall Scots pine experienced an average of 60% branch mortality and a whole-tree mortality rate of 6%. It is estimated that the fungus has been active in this plantation for 5 to 8 years. The second plantation, a single 5-ha compartment of 20-m-tall Scots pine, was also located in South Walsingham Township on St. Williams Forest Station property. In this plantation 99% of all trees examined experienced various levels of branch mortality (20% on average); whole-tree mortality was rated at 5%.

Minor Diseases

Leaf Blotch, *Guignardia aesculi* (Peck) Stewart

Reduced incidence of attack and reductions in the level of foliar damage were observed on horse-chestnut (*Aesculus hippocastanum* L.) across most of Wingham, Chatham, Simcoe and Aylmer districts. The average incidence of trees attacked in these districts was 65% in 1987 (down 26% from 1986). Foliar damage, averaged over the same area, was 19% in 1987 (down 36% from 1986).

The lowest incidence of attack and lowest level of foliar damage (50% and 2%, respectively) occurred in Aylmer District. In Wingham District, 80% of all trees examined experienced an average of 36% foliar damage; these were the highest averages recorded. Across Chatham and Simcoe districts, incidences of attack and levels of foliar damage were 65% and 20%, respectively, for both districts.

Figure 3. Scleroderris Canker (*Ascocalyx abietina* [Lagerb.] Schläpfer Bernhard)

Locations checked for both the European and the North American races in 1987 (all negative) .... ●

Table 5. Other forest diseases.

Organism	Host(s)	Remarks
Apiognomonia errabunda (Roberge) Höhnel Anthracnose	wO	a single instance of branch mortality (15%) on mature ornamental in lot 1, concession 12, Charlotteville Twp, Simcoe District
Asteroma caryae (Peck) B. Sutton Leaf spot of hickory	Hi	This fungus was seen routinely across Aylmer, Chatham and Simcoe districts wherever its host occurred. Although incidence of attack in affected stands varied greatly, foliar damage rarely exceeded 10% at any location; this was considerably lower than the 30% average recorded in 1986 for the same districts. A typical infection occurred in Dawn Twp, Chatham District, where 100% of all trees averaged 10% foliar damage in a 14-ha woodlot.
Ceratocystis ulmi (Buism.) C. Moreau Dutch elm disease	wE	a small clump of dead and dying ornamentals at a private residence in W. Zorra Twp, Aylmer District
Cronartium ribicola J.C. Fischer White pine blister rust	wP	Blister rust was recorded in two plantations, one in lot 14, concession 3, Dereham Twp, Aylmer District, where 2% of all 5-m-tall trees in a 5-ha plantation hosted main-stem cankers and the other in Keppel Twp, Owen Sound District, where 1% of the trees examined in a 10-m-tall plantation were infected.
Leucostoma kunzei (Fr.) Munk Cytospora canker	colS	noted at moderate (10%) damage levels on two 15-m-tall ornamentals, Charlotteville Twp, Simcoe District
Verticillium sp. Verticillium wilt	Catalpa, M	noted infrequently on individual ornamentals at various levels of crown damage in S. Walsingham and Charlotteville twps, Simcoe District

DIEBACKS AND DECLINES

Oak Decline

The summer of 1987 marks the 11th consecutive year that oak plots have been monitored at three sites in the region. Table 6 summarizes crown conditions in each plot for the period 1977-1987. Only endemic populations of oak leaf shredder, which caused trace levels of foliar damage (<5%), were evident in all three stands.

Maple Decline

As part of a continuing commitment to respond to the concerns of OMNR and of maple syrup producers about the condition of sugar maple stands in the province, the Forest Insect and Disease Survey (FIDS) has established 10 study plots across the Southwestern Region. The intention is to improve assessment and documentation of the current condition of sugar maple, and to monitor any possible crown deterioration.

The study-plot trees will be checked every two years for crown condition and rated for cumulative crown damage. The presence and impact of all significant forest pests will also be monitored on the study trees. Current plans are for the establishment of another 10 plots across the region in 1988. Table 7 summarizes (by crown deterioration class) the results of the initial survey (Fig. 4).

Table 6. Summary of oak decline at three locations in the Southwestern Region (100 red and/or white oak trees examined at each location).

Location (Twp)	Avg DBH of sample trees (cm)	Area affected (ha)	Year	Total percentage of crown dead 0-20	21-40	41-60	60	No. of trees dead
				No. of trees				
Simcoe District								
Charlotteville	32	315	1977	70	8	12	10	0
			1978	69	9	10	12	0
			1979	58	14	19	8	1
			1980	29	37	25	8	1
			1981	25	41	30	3	1
			1982	23	50	25	1	1
			1983	23	54	21	1	1
			1984	79	16	2	2	1
			1985	88	6	2	3	1
			1986	93	3	2	1	1
			1987	91	4	2	1	2
South Walsingham	22	150	1977	42	35	18	5	0
			1978	40	33	19	4	4
			1979	36	38	16	3	6
			1980	29	38	22	5	6
			1981	19	41	29	1	9
			1982	19	52	18	1	9
			1983	19	50	20	2	9
			1984	72	23	5	1	9
			1985	87	3	0	0	10
			1986	89	0	0	1	10
			1987	88	1	0	0	11
Chatham District								
Bosanquet	29	2,542	1977	69	7	17	7	0
			1978	69	7	17	7	0
			1979	68	11	16	5	0
			1980	53	19	21	7	0
			1981	48	24	21	7	0
			1982	49	38	9	2	2
			1983	35	39	20	4	2
			1984	80	12	2	2	4
			1985	85	3	3	4	5
			1986	90	1	0	2	7
			1987	89	0	1	3	7

Table 7. Summary of maple decline in 1987 at 10 locations in the Southwestern Region (25 sugar maple examined at each location).

Location (Twp)	Avg DBH of sample trees (cm)	Total percentage of dead crown 0-5	6-20	21-40	41-60	60	No. of trees dead
		No. of trees					
Aylmer District							
Malahide	35.3	25	0	0	0	0	0
West Oxford	27.1	25	0	0	0	0	0
Chatham District							
Plympton	29.3	24	1	0	0	0	0
Warwick	31.3	24	1	0	0	0	0
Owen Sound District							
Derby	31.6	25	0	0	0	0	0
Sullivan	42.2	25	0	0	0	0	0
Simcoe District							
Houghton	33.3	25	0	0	0	0	0
N. Norwich	31.0	25	0	0	0	0	0
Wingham District							
Morris	29.5	25	0	0	0	0	0
W. Wawanosh	30.3	25	0	0	0	0	0

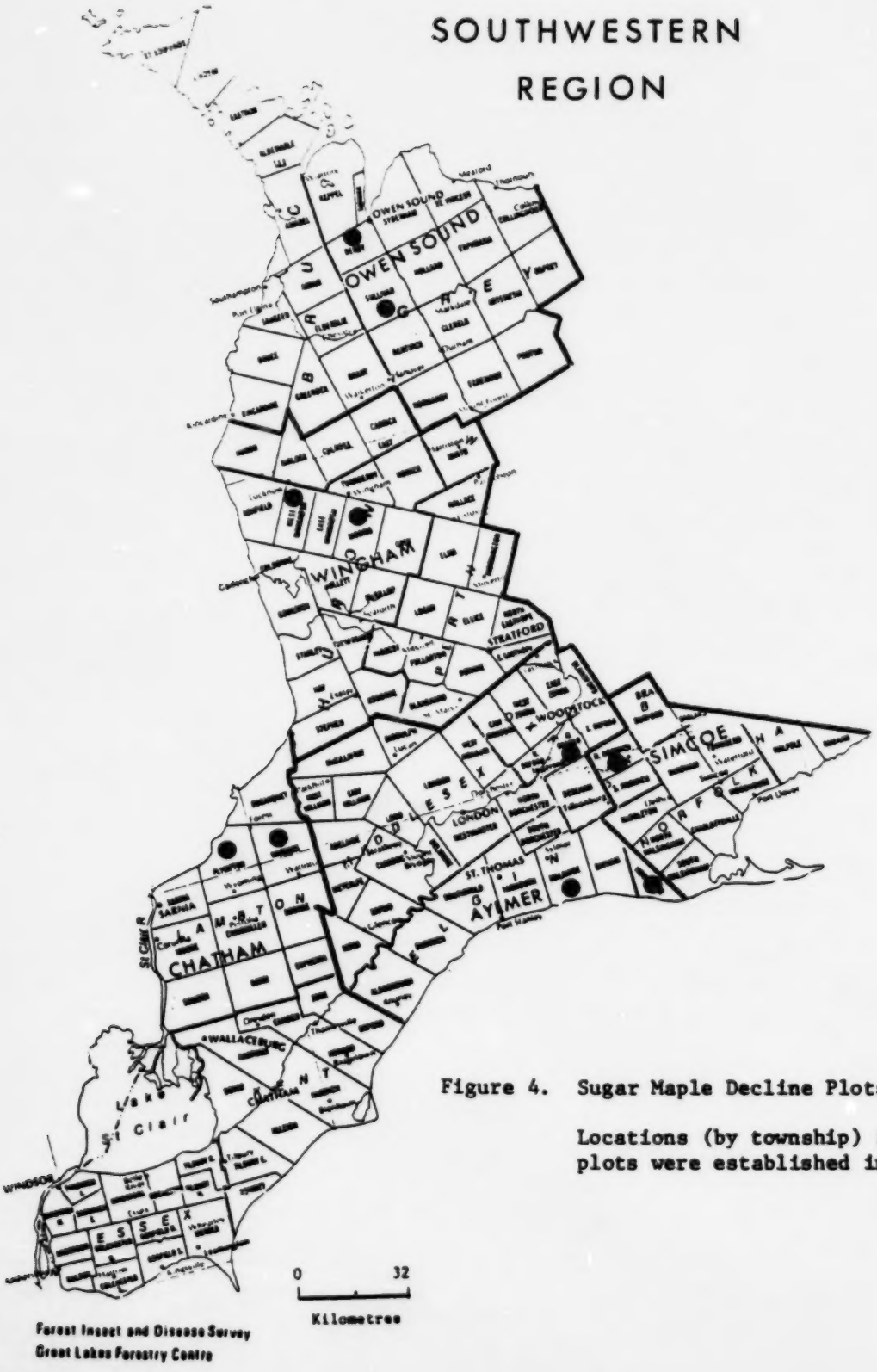

Figure 4. Sugar Maple Decline Plots

Locations (by township) in which plots were established in 1987 ....●

ABIOTIC DAMAGE

Frost

Low levels of frost damage were noted at numerous scattered locations this spring. Throughout Wingham District small (<0.1-ha) discrete pockets of damaged foliage were observed routinely on various species of hardwood; however, highly visible damage was recorded elsewhere. In Kinloss Township, sugar maple woodlots were occasionally seen with nearly 100% of fringe trees suffering low-to-moderate (10-50%) foliar damage. Open-grown, roadside sugar maples and red maples (*Acer rubrum* L.) in Grey and Elliice townships were also encountered routinely with low (10%) levels of frost damage. Sporadic insignificant damage (<1%) was noted in Aylmer and Simcoe districts.

Salt

No significant widespread damage was observed on either roadside pine plantations or windbreaks of eastern white cedar across the work area. Only a few moderately damaged cedar windbreaks were observed in the Aylmer and Simcoe districts; the incidence of attacked trees at these locations and the degree of foliar damage averaged 95% and 36%, respectively, across both districts. A 13-ha stand of 6-m-tall cedar in Howick Township, Wingham District, experienced low levels of foliar damage (20%) on 70% of the roadside trees; this represented the only significant salt damage encountered in this district.

Scorch

High temperatures and low rainfall during the late spring and early summer caused leaf scorch, primarily on sugar maple, although Norway maple (*Acer platanoides* L.) and beech (*Fagus grandifolia* Ehrh.) were also affected. Damage was noted across much of Simcoe, Aylmer, Chatham and Wingham districts. Scorch occurs during periods of hot, dry winds when rapid loss of water from the leaves cannot be balanced by water uptake by the roots. Maples are particularly susceptible to scorch. The symptoms, a necrotic band of tissue that encompasses the leaf margin, were most often recorded on trees located alongside roadways and on open-grown ornamentals. Typically, an affected tree experienced an average of 10% foliar damage throughout 75% of its crown; the unaffected portion constituted the tree's leeward side.

Winter Drying

Mild temperatures during the latter portions of the winter caused widespread low levels of damage to cedar windbreaks and hedgerows throughout most of the Wingham, Chatham, Aylmer and Simcoe districts. The results of examinations of 52 random sites are presented in Table 8.

Table 8. Summary of the results of the winter drying survey on cedar windbreaks and hedgerows in four districts of the Southwestern Region in 1987.

District	Examined sites damaged (%)	Trees affected at damaged sites (%)	Foliar damage on affected sites (%)
Wingham	66	61	9
Chatham	41	34	7
Aylmer	41	29	2
Simcoe	45	56	6

SPECIAL SURVEYS

Spruce Plantation Survey

Spruce was the focus of the 1987 annual plantation survey designed to focus on historically important pests of native species. With the exception of Owen Sound District, where Norway spruce (*Picea abies* [L.] Karst.) was chosen, white spruce (*Picea glauca* [Moench] Voss) was monitored at all locations. The results are summarized in Table 9.

Seven plantations across four districts were each surveyed on two occasions to allow for the occurrence of specific forest pests. The first visit was scheduled between 8 and 27 June and the second between 13 and 24 July. The height criterion included in the survey plan resulted in the selection of three plantations in the 0-2 m height class, two in the 2-6 m class and two in the over 6-m class.

Forest insects encountered, albeit at insignificant levels of damage, were: the spruce spider mite, (*Oligonychus ununguis* [Jac.]) in Houghton Township, Simcoe District; the eastern spruce gall adelgid, (*Adelges abietis* L.) and the balsam twig aphid (*Mindarus abietinus* Koch.) in South Walsingham Township, Simcoe District; the pine spittlebug (*Aphrophora cribrata* [Wlk.]), Colborne Township, Wingham District; and the spruce bud midge (*Rhabdophaga swainei* Felt) in Bentinck Township, Owen Sound District.

No diseases were encountered during the survey. Roosting damage (bent laterals) was noted on 18% of the trees examined at the Dereham Township plantation in Aylmer District.

Table 9. Summary of the results of a spruce plantation survey carried out at seven locations in the Southwestern Region in 1987.

Location (Twp)	Tree species	Estimated stocking (trees/ha)	Avg ht of sample trees (m)	Yellowheaded spruce sawfly		Spruce bud moth		Orange spruce needleminer		Frost		Winter drying	
				Trees attacked (%)	Total foliage damaged (%)	Trees attacked (%)	Total foliage damaged (%)	Trees attacked (%)	Total foliage damaged (%)	Trees damaged (%)	Total foliage damaged (%)	Trees damaged (%)	Total foliage damaged (%)
Aylmer District													
Dereham	wS	2,400	3.1	0	0	4.0	1.0	0	0	11.3	4.0	18.6	0.3
Owen Sound District													
Bentinck	nS	2,500	1.0	0	0	0	0	0	0	0	0	0	0
Simcoe District													
Charlotteville	wS	6,600	1.9	0	0	4.0	1.0	0	0	9.3	1.0	22.0	67.0
Houghton	wS	2,200	1.0	0	0	0	0	0	0	30.6	1.7	7.3	8.5
S. Walsingham	wS	670	22.0	0	0	0	0	40.0	1.0	0	0	0	0
Wingham District													
Colborne	wS	1,450	15.0	0	0	60.0	1.0	60.0	1.0	0.0	0.0	0	0
N. Easthope	wS	1,125	4.0	0.6	0.5	18.6	4.0	18.6	4.0	43.3	10.0	0	0

wS = white spruce
nS = Norway spruce

White Spruce Cone and Seed Survey

White spruce was the species chosen for assessment of pest impact on cones and seed production in 1987. A collection was taken of 100 hard, green cones in mid-July from a 6-m-tall hedgerow located in Townsend Township, Simcoe District. Results of this sample are given in Table 10. Approximately half of the damage noted was caused by the spruce cone maggot *(Lasiomma anthracinum)* [Czerny]); the balance of the damage was external, and was caused by unknown Lepidoptera.

Table 10. Summary of the results of the white spruce cone and seed survey carried out in the Southwestern Region in 1987.

Location (Twp)	Cones		Seeds
	Sound (%)	Damaged (%)	Loss in damaged cones (%)
Simcoe District			
Townsend	96	4	56

Pinewood Nematode, *Bursaphelenchus xylophilus* (Steiner and Buhrer) Nickle

This microscopic pest has now been identified positively in 10 townships across all five districts (Fig. 5). Over the previous three field seasons a total of 45 samples from 26 townships across southwestern Ontario have been submitted for laboratory analysis. Fourteen of these samples (which represent 10 townships) tested positive for the pinewood nematode, which has been recovered from five species of pine to date, specifically red pine, white pine, Scots pine, jack pine *(Pinus banksianae* Lamb.), and Austrian pine *(P. nigra* Arnold). The nematode has also been recovered from white spruce.

Beech Bark Disease

This disease is attributed to the beech scale *(Cryptococcus fagisuga* Lindinger) which thrives on the bark of beech. Young nymphs of the scale pierce the bark with their sucking mouth parts and feed. These punctures then provide an infection site for a nectria fungus *(Nectria coccinea* var. *faginata* Lohm.) that attacks bark, cambium and sapwood. The subsequent damage can canker and kill a tree within a year or two.

Figure 5. Pinewood Nematode (*Bursaphelenchus xylophilus* [Steiner & Buhrer] Nickle)

Results, by township, of 1985-1987 surveys:

positive .....▼
negative .....●

A randomly chosen stand that contained a significant component of beech was examined in each of Wingham, Chatham, Aylmer and Simcoe districts. No evidence of either the scale or the fungus was found at any of the locations examined.

Acid Rain National Early Warning System (ARNEWS)

This year the annual inspection of the three study plots included analysis of soil samples. This process involved collections at five randomly located points that were representative of the site. Within a 5-m radius of these locations, which have been staked permanently, five mini-pits were established for soil sampling.

The maple trumpet skeletonizer (*Epinotia aceriella* [Clem.]) was the only significant defoliator in plot 5-07, West Wawanosh Township, Wingham District. It caused low levels of defoliation (5%) on 100% of the sugar maple trees present. The high levels of leaf anthracnose recorded in 1986 in plot 5-25, Howard Township, Chatham District, failed to recur. No traces of anthracnose were visible, probably as a result of the poor conditions for infection offered by a dry spring. Black cherry trees in plot 5-26, South Walsingham Township, Simcoe District, had high numbers of gall mites (Eryophyidae) at low levels of damage (10%) on 100% of all trees examined. Adult feeding damage (also in plot 5-26) by a leaf-mining fly of the Agromyzidae family resulted in low damage levels (10%) on 100% of all red oak, white oak (*Quercus alba* L.) and black oak present.

Once again, pending the full processing of all field data and samples collected, no statement regarding the potential impact of acid rain is possible.

Climatic Data

Forest insects and diseases, during times critical to their development, can be greatly influenced by prevailing weather conditions. Baseline data (Table 11) are included in this report and may help in explaining variations in pest population levels and the severity of outbreaks. Data were supplied by the Atmospheric Environment Service, Department of the Environment.

Table 11. Summary of mean temperatures and total precipitation at two locations in the Southwestern Region in 1987.

Location	Month	Mean temperature		Deviation from normal (°C)	Total precipitation		Deviation from normal (mm)
		normal[a] (°C)	actual (°C)		normal[a] (mm)	actual (mm)	
Blyth	Jan.	-7.9	-5.1	+2.8	105.8	99.3	-6.5
	Feb.	-8.2	-5.7	+2.5	67.2	19.6	-47.6
	Mar.	-2.8	0.0	+2.8	62.7	67.7	+5.0
	Apr.	5.1	8.8	+3.7	71.9	48.0	-23.9
	May	11.8	14.1	+2.3	73.7	26.0	-47.7
	June	17.0	18.9	+1.9	75.0	100.2	+25.2
	July	19.7	22.1	+2.4	76.6	111.0	+34.4
	Aug.	18.8	19.2	+0.4	96.3	131.5	+35.2
	Sept.	15.1	16.4	+1.3	88.4	101.0	+12.6
	Oct.	8.7	6.8	-1.9	90.3	95.0	+4.7
	Nov.	2.5	4.3	+1.8	101.4	117	+15.6
	Dec.	-4.3	0.0	+1.3	116.2	61	-55.2
London Airport	Jan.	-6.6	-5.2	+1.4	75.2	64.8	-10.4
	Feb.	-6.1	-5.2	+0.9	60.5	19.6	-40.9
	Mar.	-0.9	2.0	+1.1	75.1	68.2	-6.9
	Apr.	6.4	8.8	+2.4	81.2	66.2	-15.0
	May	12.4	15.4	+3.0	66.9	68.8	+1.9
	June	17.9	19.9	+2.0	73.6	48.7	-24.9
	July	20.3	22.8	+2.5	72.4	34.8	-37.6
	Aug.	19.5	19.4	-0.1	80.3	98.6	+18.3
	Sept.	15.4	15.9	+0.5	78.6	72.9	-5.7
	Oct.	9.4	6.8	-2.6	73.4	84.2	+10.8
	Nov.	3.1	4.3	+1.2	84.7	114.5	+29.8
	Dec.	-3.5	-0.2	+3.3	87.5	100.7	+13.2

[a] Normal temperature and precipitation are calcualted from data for the period 1930-1980.